

CHOREA AS PRESENTING SYMPTOM OF DIABETES MELLITUS: A CASE REPORT

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We present the case of a 52 year old post-menopausal Caucasian female without significant past medical history, who presented to our emergency room with the chief complaint of involuntary right arm and leg movement for 5 days. The movements began suddenly, remitted during sleep, but were otherwise constant and progressively worsening. The patient had consulted an outpatient neurologist two days earlier, who prescribed benztropine and levodopa, with which patient reported no relief of symptoms. Upon review of systems, the patient also noted the recent onset of polyuria and polydipsia. She denied significant past medical history, and denied a family history of Huntington's chorea or other neurological disorder. Neurological examination revealed right upper extremity and right lower extremity chorea, with normal muscle tone and strength. Deep tendon reflexes and sensation were intact, and mental status was within normal limits.

In the emergency room, serum glucose was elevated at 441 mg/dL. Glycosylated hemoglobin A1C was significantly elevated at 14.7%. A venous blood gas revealed a pH of 7.45. Serum was negative for ketone bodies. A non-contrast head CT revealed a hyperdense left putamen. This was confirmed on MRI, which revealed T1 hyperintense signal abnormality and minimal enhancement of the left putamen. Hypointensity in the same region was demonstrated on FLAIR and T2-weighted images.

The patient was diagnosed with non-ketotic hyperosmolar hyperglycemia secondary to previously undiagnosed diabetes mellitus, and she was admitted to the hospital for further management and work-up of dyskinesia. For hyperglycemia she was started on long-acting insulin once daily, with short-acting pre-prandial insulin coverage. Benztropine and levodopa were discontinued. Fingertick glucose improved to less than 200 mg/dL by hospital day two, with a corresponding improvement in dyskinetic movement. By the time of discharge on hospital day number eight, neurological symptoms had nearly resolved. The patient was transitioned to oral hypoglycemic agents without recurrence of choreic symptoms.

Non-ketotic hyperosmolar hyperglycemia is commonly associated with a number of neurological impairments, including delirium, coma, and seizures, but dyskinesia is rarely if ever cited as an associated symptom. A small number of reports in the literature do describe a clinical coincidence of dyskinesia and hyperglycemia. Even fewer report the onset of a sudden, transient, unilateral chorea or hemiballism as the presenting symptom of previously undiagnosed diabetes mellitus.¹⁻⁴

A review of the literature finds that most cases of sudden, hyperglycemia-induced dyskinesia occur in females between the ages of 50-80 years.^{2,3} The majority of reported patients have been of Asian ethnicity; one review of the literature notes 30 out of 35 reported cases, or 86%, occurred in Asian patients.⁴ The reason for this has not been established. The clinical course of most cases tends to run similarly to the above case, with the lessening, and eventual resolution of symptoms with the establishment of glycemic control. In a minority of cases, the patients were symptomatic for a prolonged period of time.^{3,5}

The radiological findings in prior cases are comparable with those of our patient, with the most frequently reported being hyperdensity of the contralateral putamen and/or caudate nucleus

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on CT, and high signal intensity in the same area on T1-weighted MRI images.^{4,6,7} Among patients for whom long-term follow-up was reported, resolution of symptoms usually corresponded with eventual resolution of radiographic findings.³⁻⁴

An exact mechanism behind the described phenomenon remains unclear, although a small number of theories have been proposed. It has been suggested that the presence of serum hyperosmolarity and hyperglycemia induces mild ischemia in the putamen via hypoperfusion. This theory is supported by a case series reporting caudate and putamen hypoperfusion on SPECT imaging in ten patients with hyperglycemia-induced chorea.⁷ The combination of hyperglycemia, hyperviscosity, and ischemia may then create an environment favoring incompetence of the blood brain barrier, leading to small petichial hemorrhages in the basal ganglia, producing dyskinesia.^{1,7,8} The acute metabolic derangement created by the presence of hyperosmolarity may also favor calcium deposition in these areas of the brain, leading to further impairment of function.¹

Other theories linking hyperglycemia and dyskinesia note the effect of hyperglycemia on neurotransmitter function in the brain. Hyperglycemia creates an energy state at the cellular level favoring anaerobic metabolism, which in turn depletes gamma-aminobutyric acid (GABA), due to the fact that acetoacetate, a GABA substrate, is quickly depleted in the anerobic state.¹ It is plausible that depletion of GABA can contribute to the development of chorea via it's interaction with dopamine. GABA acts to inhibit dopaminergic neurons in the nigrostriatal system, therefore the hyperglycemia-induced inhibition of GABA may create a hyperactive dopaminergic state, giving rise to the onset of choreic movement. This theory is supported by a case report citing efficacy of the use of haloperidol, a dopamine inhibitor, on a patient with hyperglycemic chorea.⁶ Interestingly, post-menopausal women are in a state of relative dopamine hypersensitivity secondary to the loss of estrogen, and as such are more likely to be susceptible to a hyperactive dopaminergic state. This may explain why the majority of cases have been reported in women between the ages of 50-80 years.¹

Hyperglycemia-induced chorea is a medical condition that has been rarely described in the literature, but the reports that are available reveal a disease pattern with a consistent onset of symptoms, radiographic findings, and limited course once treatment has been initiated. Poorly controlled or as-yet undiagnosed diabetes should be considered in the differential diagnosis when evaluating patients presenting with new onset dyskinesia. If discovered, focus on correction of serum glucose levels may prove more effective to control involuntary movement than the use of anti-cholinergic or dopaminergic agents.

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